

REMARKS

The application includes claims 7-34 prior to entering this amendment.

The examiner rejects claims 7-34 under 35 U.S.C. § 102(e) as being anticipated by Takahashi (U.S. Patent No. 6,665,439).

The applicant amends claims 7, 18, and 29-31.

The application remains with claims 7-34 after entering this amendment.

The applicants add no new matter and request reconsideration.

Claim Rejections Under § 102(e)

Takahashi is a method and apparatus for detecting the edges of features in an image based on color attributes of the pixels. *See* Takahashi Abstract. The present application claims a method and apparatus for interpolating target pixels from image data. A person of ordinary skill in the art of image processing would recognize that edge detection is not the same thing as interpolation.

Takahashi does not teach interpolation of image data. The only reference to interpolation in the entire Takahashi reference, and the one that the Examiner has used as the root of the idea that Takahashi anticipates the present application, is at column 18, lines 49-61. This passage of Takahashi says:

Furthermore, by applying edge templates to pixel vector data, edge directions can be obtained easily and reliably. If the direction of an edge is known, then it becomes possible to form that edge as a continuous line (as expressed in the shape image that is generated) even if all of the pixels corresponding to that edge are not detected. That is to say, if the direction of an edge can be reliably obtained on the basis of a part of the pixels of that edge, then interpolation of the remaining pixels can readily be performed, to thereby eliminate any breaks in the continuity of the edge. For that reason, the basic feature of the present invention whereby it is possible not only to detect the strengths of edges, but also to reliably estimate their directions, is highly important.

It is clear from this passage that Takahashi does not actually teach a method or apparatus for interpolation; it merely says that subsequent interpolation *is possible*. Takahashi is simply asserting that *after* utilizing its invention, one *could* interpolate to make up for missing edge data. Takahashi does not teach a method that could be used for this interpolation or an apparatus that could implement such a method. In short, Takahashi does not teach image interpolation; it merely teaches that the output data of its edge detector could be interpolated to make up for missing data.

In contrast, the present application specifically claims “[a]n interpolator” and “[a] method for interpolating.” *See* Claims 7 and 18. Consequently, the applicants do not believe that amendments to the claims should be necessary to overcome the Takahashi reference, which is clearly teaching a completely different image processing function. However, in the interest of moving this case toward allowance, the applicants amend claims 7 and 18 to clarify that the claimed invention generates target pixels based on interpolation of image data. As described above, Takahashi does not teach interpolation, so the amendments to these claims should make it abundantly clear that Takahashi does not anticipate the claimed invention.

Regarding claims 7 and 18, the applicants amend claim 7 and 18 to clarify that target pixels are interpolated from source pixels. As described above, Takahashi does not teach interpolation. Further, the claims recite a match table. The Examiner proposes that Takahashi teaches this feature at column 5, lines 5-30. *See* Office Action paragraph 6. However, this section of Takahashi teaches a process by which the edge that a pixel belongs to can be determined. *See* Takahashi column 5, lines 5-30. This section of Takahashi does not mention anything about a match table, or any table of data for that matter. The remainder of the Takahashi reference does not remedy this deficiency. Therefore, Takahashi does not teach interpolation or a match table as recited in the claims. Consequently, claims 7 and 18 and their dependent claims, 8-17 and 19-34, are allowable over Takahashi and the applicants request allowance.

Further regarding claims 10 and 21, the claims recite that the image features are adapted to dynamically change according to user preferences. The Examiner proposes that this is taught in Takahashi at column 20, lines 54-58. *See* Office Action page 4, lines 3-4. Indeed, this portion of Takahashi does teach how control parameter values can be adjusted to provide better edge detection. *See* Takahashi column 20, lines 51-58. However, changing these control parameter values does not dynamically change the edges in the image; it merely changes how the edges are detected. Further, there would be no point for Takahashi to teach that its edge detection apparatus can dynamically change the edges in the image, because the whole point of the apparatus is to detect the edges as they exist in the original image. *See* Takahashi Abstract. Consequently, Takahashi does not teach that the image features are adapted to dynamically

change according to user preferences, as recited in the claims. For this additional reason, claims 10 and 21 are allowable over Takahashi and the applicants request allowance.

Further regarding claims 11 and 22, the claims recite that the feature extractor includes a state machine for each image feature. Nowhere in the disclosure of Takahashi does it suggest that its apparatus includes a state machine. The Examiner proposes that Takahashi FIG. 1, elements 21-24 are state machines, but there is entirely no basis for this assertion. *See* Office Action page 4, lines 5 and 6. Takahashi does not give any indication of how elements 21-24 are physically or virtually embodied. Takahashi does not provide any sort of state variables, state values, or state operations associated with elements 21-24. And finally, Takahashi simply does not say that elements 21-24 are state machines. Consequently, Takahashi does not teach a feature extractor that includes a state machine for each image feature, as recited in the claims. For this additional reason, claims 11 and 22 are allowable over Takahashi and the applicants request allowance.

Further regarding claims 14 and 25, the claims recite an alignment controller and aligning matched image features in the match table. The Examiner proposes that FIG. 5, element 11 of Takahashi teaches this. *See* Office Action page 4, lines 11-13. However, the function described in element 11 of FIG. 5 does not actually align anything, much less matched image features. Element 11 generates four edge vectors corresponding to successive object pixels. *See* Takahashi FIG. 5. This has nothing to do with aligning matched image features. Further, there would be no point in aligning image features in Takahashi because the whole goal of the invention is to extract edge data from an image so that it can be stored separately. *See* Takahashi Abstract. If the individual edges were all aligned in an alignment controller, the original object data would be lost; thus defeating the whole purpose of the invention. Consequently, Takahashi does not teach an alignment controller and aligning matched image features in the match table, as recited in the claims. For this additional reason, claims 14 and 25 are allowable over Takahashi and the applicants request allowance.

Further regarding claims 16 and 27, the claims recite identifying a transition segment. The Examiner proposes that this is taught by Takahashi FIG. 9A. *See* Office Action page 4, lines 16-17. However, nothing in the disclosure of Takahashi addresses segments, much less a transition segment. FIG. 9A of Takahashi is a pattern that is used to help determine if a pixel 202 is an edge pixel. *See* Takahashi column 15, lines 38-67. Takahashi certainly doesn't teach

that this pattern or anything else in its disclosure is a segment or a transition segment. It should be noted that the patterns in FIGs. 9A-9D of Takahashi are more akin to step functions than transition segments. Since, the patterns show weak-strong-weak behavior, the net result of the pattern is no transition at all. Consequently, Takahashi does not teach identifying a transition segment, as recited in the claims. For this additional reason, claims 16 and 27 are allowable over Takahashi and the applicants request allowance.

Further regarding claims 17 and 28, the claims recite identifying a pivot pixel. The Examiner proposes that this is also taught by Takahashi FIG. 9A. *See* Office Action page 4, lines 18-19. However, nothing in the disclosure of Takahashi addresses a pivot pixel. FIG. 9A of Takahashi is a pattern that is used to help determine if a pixel 202 is an edge pixel. *See* Takahashi column 15, lines 38-67. The method/apparatus of Takahashi successively steps through every pixel in the image and applies a mathematical function to them. The center pixel in FIG. 9A is just a representative. In order for this pixel to be equivalent to the pivot pixel recited in the claims, every pixel in Takahashi would have to be a pivot pixel. But if that was the case, then there would be no point in having an alignment controller identifying a pivot pixel. Consequently, Takahashi does not teach identifying a pivot pixel, as recited in the claims. For this additional reason, claims 17 and 28 are allowable over Takahashi and the applicants request allowance.

Further regarding claim 20, the claim recites "identifying programmable image features." Takahashi does not teach programmable image features. Takahashi only teaches one type of feature; edges. Thus, there would be no reason for Takahashi to identify programmable image features. The Examiner proposes that Takahashi teaches this because it teaches that Takahashi's apparatus includes storage for the edges. *See* Office Action page 4, lines 1-2. However, the Examiner has not given any reasoning to support the idea that storing edge data in Takahashi is equivalent to identifying programmable image features, as recited in the claim. For this additional reason, claim 20 is allowable over Takahashi and the applicants request allowance.

Further regarding claims 29 and 32, the claims recite that the feature table includes a plurality of pairs of numbers, "a first number in the pair defining a start position and second number in the pair defining an intensity for each of the image features identified." The Examiner proposes that Takahashi's a_i and c_i are equivalent to the claimed first and second numbers. However, Takahashi specifically teaches that a_i are control parameters used "to determine

whether the edge detection will be based mainly on the c_1 values, the c_2 values, or on the c_3 values" and that c_i are a "form of intensity values", neither of which is a start position. Takahashi column 19, lines 62-67. Further, it should be noted that the 'table' shown by equation 8 of Takahashi is actually a mathematical function. It shows multiplication of a_i and c_i , not population of a table with these values. Step 1002b of Figure 19 in Takahashi makes it clear what the true function of a_i and c_i are; they are multiplied together to obtain an array of color vectors. This array of color vectors is not a feature table containing both start positions and intensity data. Therefore, neither a_i nor c_i are the first number in the pair defining a start position recited in the claims. Consequently, claims 29 and 32 are allowable over Takahashi and the applicants request allowance.

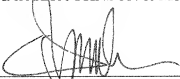
Conclusion

For the foregoing reasons, the applicants request reconsideration and allowance of all remaining claims.

The applicants ask the examiner to telephone at 503.222.3613 if he believes that other limitations or clarifications are needed to place the case in condition for allowance.

Respectfully submitted,

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